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### Notes on tetanus (lockjaw)

Tetanus (Greek *tetanos*, derived from *teinein* to stretch) appears through the ages in military medicine. Slapping infected dung on to the newborn umbilical cord caused tetanus neonatorum or "trismus nascentium" to be rampant in the West Indies and Africa. Osler's textbook describes the "eight days sickness" caused by umbilical sepsis, which in St Kilda killed 84 of 125 children within a fortnight of birth.<sup>1</sup> In the first world war it occurred in 1.47 per 1000 of the British wounded, and in 12.5 per 1000 in the Peninsular campaign.<sup>2</sup>

In an earlier battle, Sir Charles Bell's famous war illustration portrays tetanus in a soldier during Sir John Moore's retreat to Corunna.

*Risus sardonius* hails from the sneering grin thought to resemble the effect of a Sardinian rununculus, which on being chewed contorted the face of the eater. The anaerobic bacillus *Clostridium tetani* was discovered by Nicolaier in 1885. In 1889 Koch's pupil Kitasato obtained the bacillus of tetanus in pure culture and conveyed the disease to animals.

Antitoxin was quickly recognised by Thomas Clifford Allbutt (*System of Medicine* 1896;1:237): "The diphtheria and tetanus antitoxins act directly on the toxins." Antitetanus serum was in general use before the first world war, but the dose was variable. And the intrathecal, intravenous, or intramuscular routes each had its proponents. The mortality was still between 37% and 50%.

Ancient descriptions are impressive:

### Hippocrates

"The master of a large ship mashed the index finger of his right hand with the anchor. Seven days later a somewhat foul discharge appeared; then trouble with his tongue—he complained he could not speak properly. The presence of tetanus was diagnosed, his jaws became pressed together, his teeth were locked, then symptoms appeared in his neck; on the third day opisthotonos appeared with sweating. Six days after the diagnosis was made he died"

In the Aphorisms (c 380 BC):<sup>3</sup> section V 2, "Spasm supervening on a wound is fatal." And section V 6, "Such persons as are seized with tetanus either die within four days, or if they pass these they recover".

### Aretaeus

An inhabitant of Cappadocia (1st century AD), an

ancient kingdom of Asia Minor, Aretaeus left this wonderful characterisation:<sup>5</sup>

"Tetanus in all its varieties, is a spasm of an exceedingly painful nature, very swift to prove fatal, but neither easy to be removed . . . There are three forms of the convulsions, namely in a straight line, backwards and forwards . . . there is tension in a straight line of the whole body, which is unbent and inflexible . . .

Opisthotonos bends the patient backward, like a bow, so that the reflected head is lodged between the shoulder-blades; the throat protrudes; the jaw sometimes gapes, . . . respirations stertorous; the belly and chest prominent . . . the abdomen stretched, and resonant if tapped; the arms strongly bent back in a state of extension; the legs and thighs are bent together . . .

The causes of these complaints are many; for some are apt to supervene on the wound of a membrane, or of muscles, . . . And women also suffer from this spasm after abortion; and in this case they seldom recover . . .

In all of these varieties then, there is pain and tension of the tendons and spine, and of the muscles connected with the jaws and cheek; for they fasten the lower jaw to the upper, so that it cannot easily be separated even with levers or a wedge. But if one by forcibly separating the teeth, pour in some liquid the patients do not drink it but squirt it out . . .

But if they are bent forward (Emprosthotonos), they are protuberant at the back, the loins being extruded in a line with the back, the whole spine being straight; . . . the lower jaw fixed on the breast bone; the hands clasped together, the lower extremities extended; pains intense; the voice altogether dolorous. Should the mischief then seize the chest and respiratory organs, it readily frees the patient from life . . .

"An inhuman calamity! an unseemly sight! . . . But neither can the physician, furnish any assistance, as regards life, relief from pain or from deformity."

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- 2 Official history of the war (Pathology, 1923), cited by Wilson SAK, in: *Neurology*. London: Arnold, 1940:626.
- 3 Beck T. *Hippokrates Erkenntnis*. Jena: Diedrichs, 1907:132.
- 4 Adams F. Aphorisms. In: *The genuine works of Hippocrates*. Vol 2. London: The Sydenham Society 1849:737-8.
- 5 Adams F. *The extant works of Aretaeus, the Cappadocian*. Edited and translated, London: The Sydenham Society, 1856:253.